

- **LEC EBITDA losses mirror the losses in operating profits (Figure 7).**
- **LEC equity value declines by from about 20 percent in Scenario 1 to about 45 percent in Scenario 4 (Figure 8).** These numbers are not intended and could not be used to predict actual equity performance: they are merely indicative of the potential for serious losses if the FCC were to adopt the unreasonable policies explored in this hypothetical analysis, even using the IDSS model. I would not expect the FCC to do so precisely because the potential damage is so severe.

VII. CONCLUSION.

38. All models make assumptions and abstract from the details of the real world. Where the assumptions can be verified or it can be shown that the results of the model are relatively insensitive to the assumptions, a model can still be used to evaluate policy choices. However, for the IDSS model, (i) the economic content of the model is buried in its assumptions, (ii) the calculations contain errors and (iii) the results are sensitive to assumptions that cannot be verified. In these circumstances, use of the model -- in its present form -- will create more debate and uncertainty than it will resolve.

Table 1
Errors and Omissions

<u>Location of the Error</u>	<u>Nature of the Error</u>
A:69-70; 80-81	sum of % of lines that are CLEC and % of lines that are LEC Total Bill can exceed 100 percent.
A:K284	mysterious additional 1 percent
A:M114, M116 M132	0s instead of reference to previous cells
A:G212 - W212	formula error - should be $G211*(1-\$N209)$
A:I262 - W262	reference to wrong row
C:261	missing formula: $((G213*G159)+.5*G213*G209)*12)/1000$
C:267	missing formula: $((G219*G165)+.5*G219*G215)*12)/1000$
C:F334 and vicinity	counts both unbundled and facilities loops in the fraction of lines lost to unbundled loops
D:F271, D:G271	formula error - should be F107-E107
D:330, D:189-90	inconsistent treatment of depreciation. Fixed in \$ in D:330 and fixed rate in D:189.
D:H304	unknown constant 1.0407
E:H177	odd 6 percent growth assumption.
E:H771 F:H631 and vicinity	double-counting in formula. LEC toll market shares can exceed 100 percent.
E:E50 and vicinity	Column E missing formula. Mysterious 1.0002 factor elsewhere.
E:G1039-1045 and vicinity	inconsistent treatment of discount in numerator and denominator.
E:G1003-1011	application of the discount. Mysterious constant 1.11.
E:G1014-1020 and vicinity	inconsistent treatment of discount. Mysterious 1.11 factor
E:1081	missing formula
F:G266	reference to blank cell on Sheet A
F:G573 and vicinity	$@LN(1)^2$ is a complex version of zero. ²⁸
F:820	missing formula

²⁸ Analogous to the classic Shepherd Algorithm in Operations Research which calculates the size of a large flock of sheep in hilly terrain by counting the feet and dividing by 4.

Table 2

The Model is Extremely Sensitive to Many Assumptions Which Have a High Level of Uncertainty	
Unknowable Information	Change in Assumption and Resulting Effect on EBITDA
Spec 25 -- Residence Local Rates First Year of CLEC Competition	An increase of 10% from .4% results in an increase in LEC revenues of \$1.9 billion .
Spec 26 -- Business Local Rates First Year of CLEC Competition	A decrease of 10% from -2.6% results in a loss of \$1.5 billion for the LEC.
Spec 66 -- The "Skew" Factor	A .25 decrease from .45 results in a \$1.4 billion LEC loss in earnings.
Spec 73 -- % CLEC Loops Provided With CLEC's Own Facilities	An increase of 20% results in a decrease in LEC earnings of \$5.6 billion .
Specs 79 and 80 -- Percent of LEC "Total Bill" Customers	An increase of 10% starting in 1997 increases LEC earnings by \$6 billion .
Specs 117 and 118 -- Total added LEC marketing expense when unbundled loops exceeds threshold: Residence and Business	An increase of \$5 billion results in a \$10.6 billion decrease in LEC earnings.
Specs 119 and 120 -- Total added LEC marketing expense if LEC share of "total bill" customer loops exceeds threshold: Residence and Business	An increase to \$5 billion from \$0 results in a \$10.8 billion decrease in LEC earnings.
Spec 129 -- Annual change in CICs for toll minutes (before inflation)	An decrease to -10% from -2% increases LEC earnings by \$5.0 billion .
Spec 131 -- Annual change in embedded cost before inflation (LEC, IXC & CLEC)	A decrease to -5% from -2% results in a \$25.6 billion increase in LEC earnings.
Spec 134 -- Net replacement investment [percentage of prior year plus constant]: Percentage	A change from .776% to 3% results in an increase in LEC earnings of \$7.9 billion .
Spec 134 -- Net replacement investment [percentage of prior year plus constant]: Constant	An increase from \$0 to \$5 results in a \$4.0 billion increase in LEC earnings.
Spec 151 -- The Loss in Line Growth at Which Cost is Increased to Represent Stranded Plant	An increase to 10% from 0% decreases LEC earnings by \$7.5 billion .
Spec 154 -- Percent of [ordinary line cost attributed to shadow lines] Which is Reduced in Each of 10 Successive Years	An increase to 2% from 0% after the change described directly above, increases LEC earnings by \$3.0 billion .
Spec 166 -- Business interLATA toll per line	A 1% increase from 0% and 2.25% causes LEC earnings to increase \$2.0 billion .
Spec 168 -- Business intraLATA toll per line	A 3% decrease from -1% and 2.25% results in a decrease in LEC revenues of \$2.4 billion .
Base Case is the n/e/r/a base case. All changes in earnings are based on EBITDA for the year 2006.	

Figure 1: Predicted Loss in LEC Lines from the Base Case



**Figure 2: IDSS Forecast Changes in LEC Local Revenues from Base Case
(Basic and Extended Service + SLC + Vertical Services)**

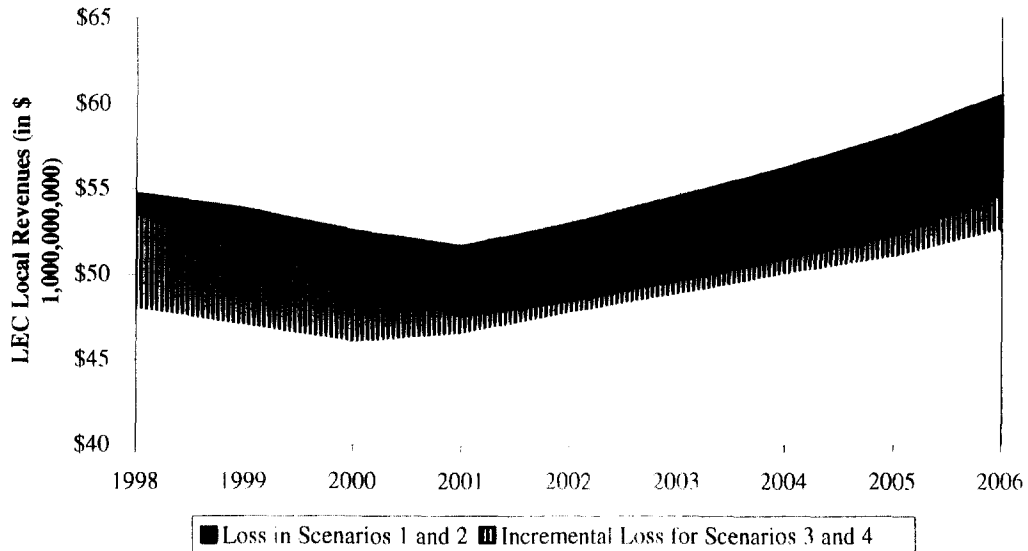


Figure 3: IDSS Predicted LEC Toll Revenue Losses from Base Case

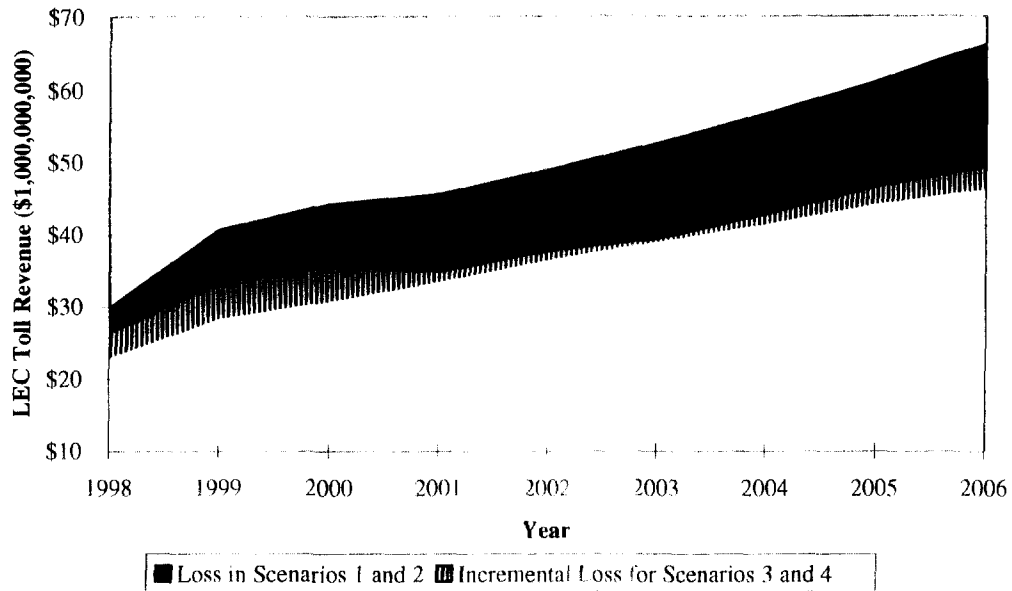


Figure 4: IDSS Predicted LEC Total Revenue Losses from the Base Case

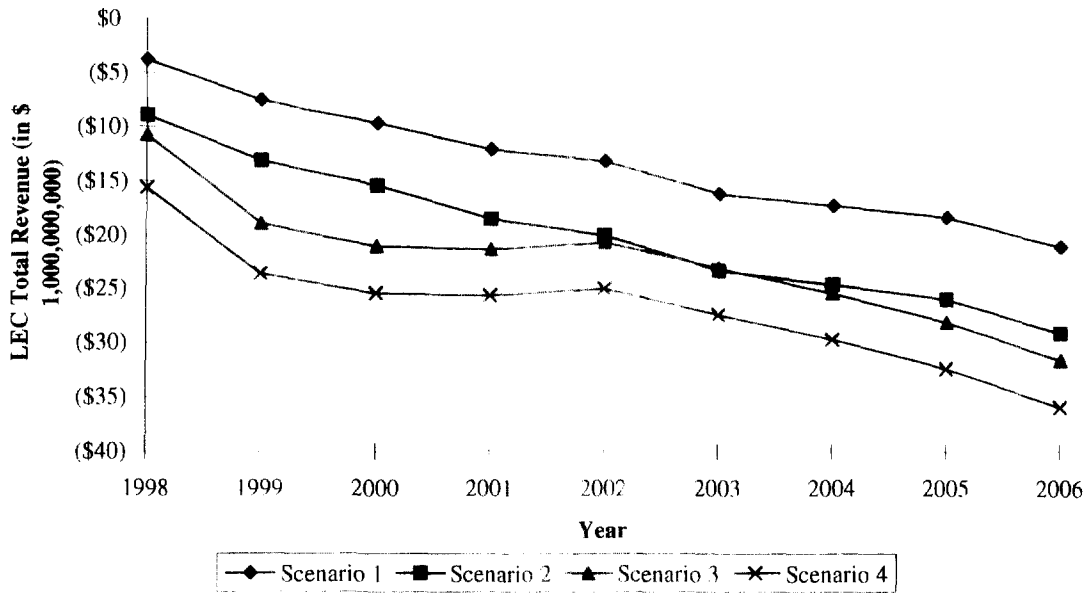


Figure 5: IDSS Predicted Difference in LEC Operating Expense from Base Case

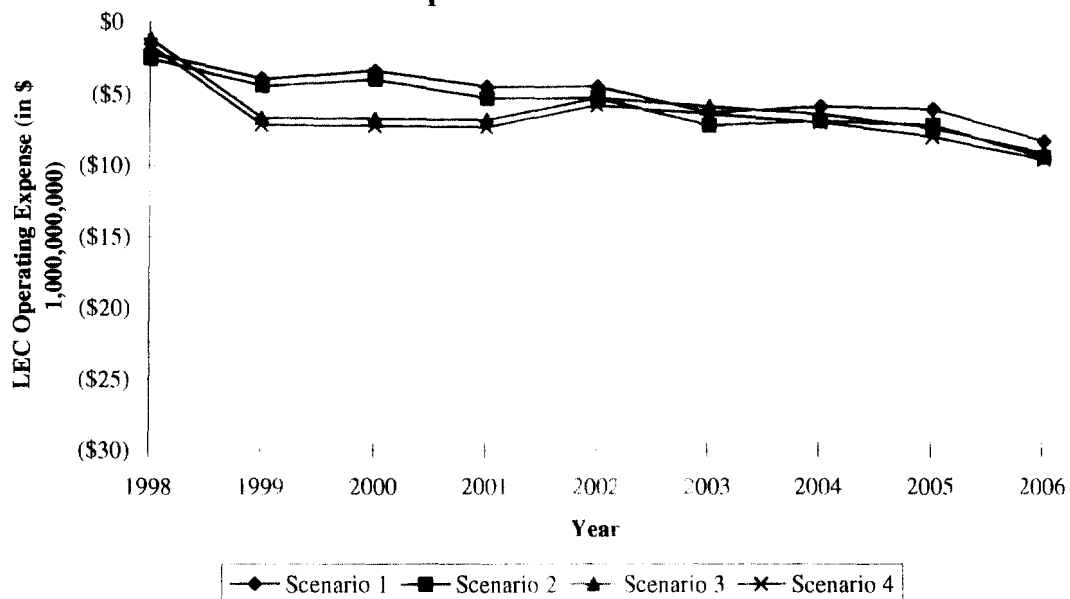


Figure 6: IDSS Predicted Difference in LEC Operating Profits from the Base Scenario

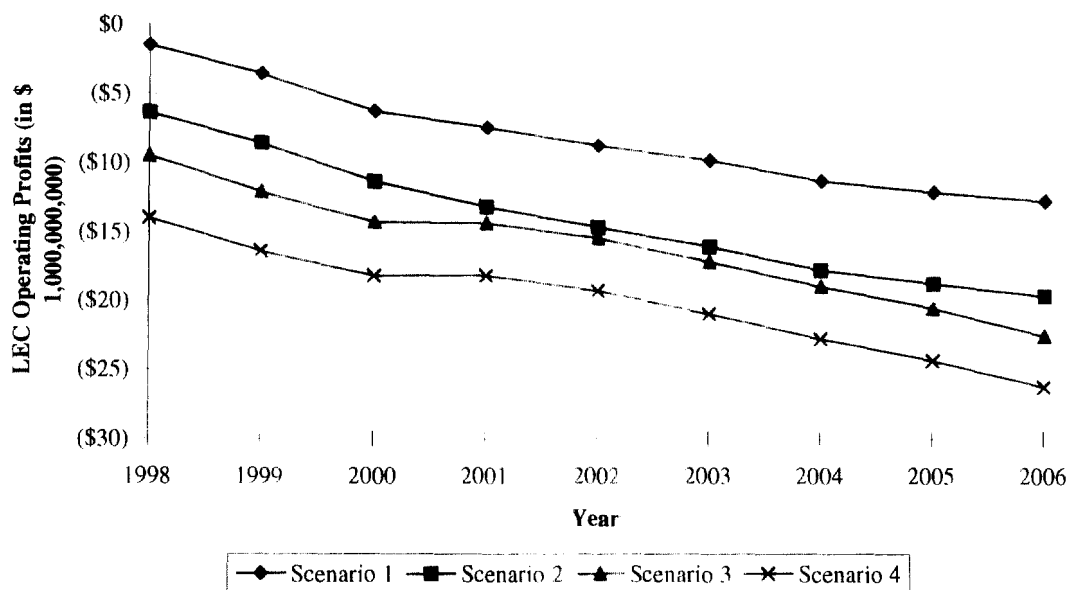


Figure 7: IDSS Predicted Losses in LEC EBITDA from the Base Case

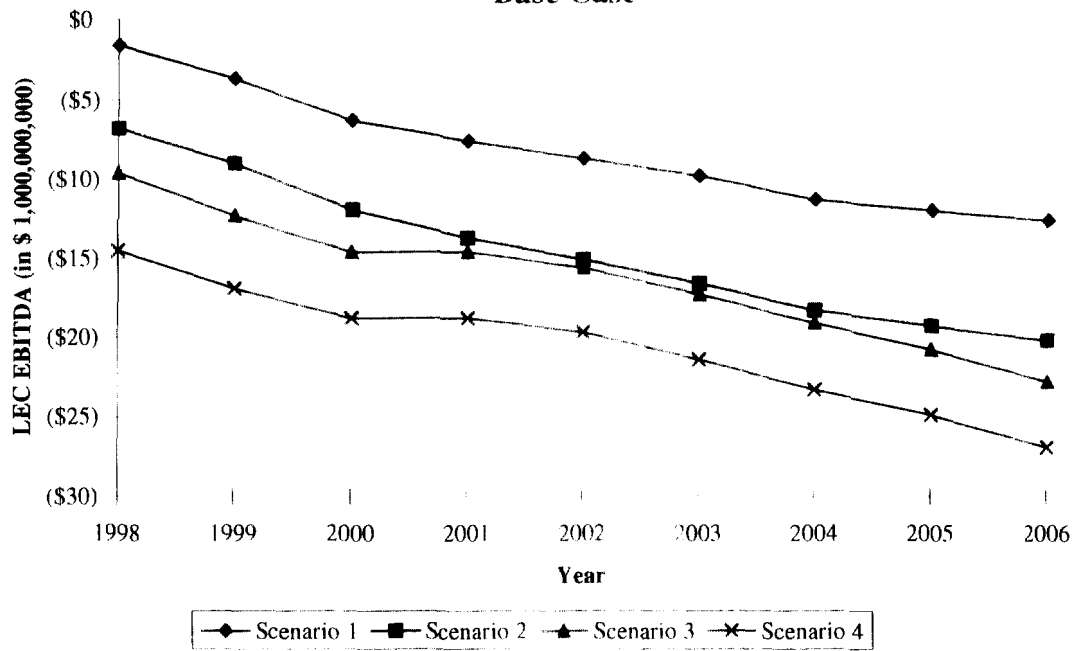
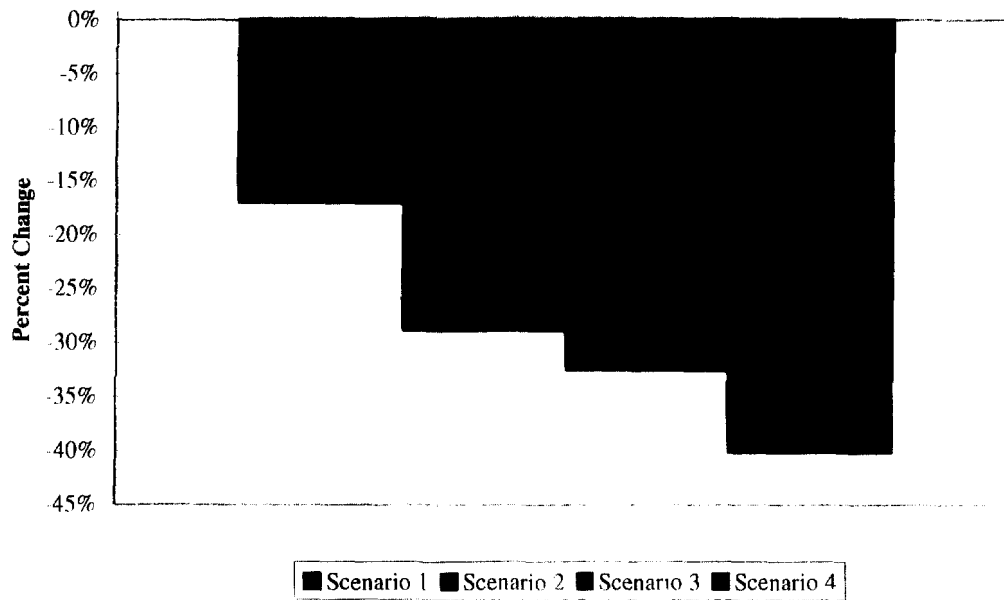


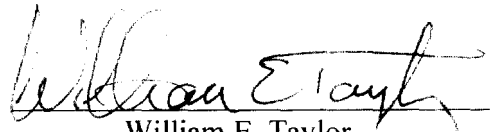
Figure 8: Potential Decline in LEC Equity Value from Base Case



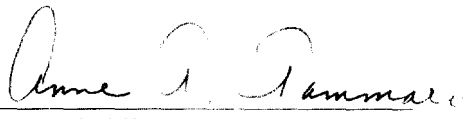
COMPARISON OF THE IDSS MODEL WITH DR. CRANDALL'S MODEL

The IDSS model and Dr. Crandall's model differ in four fundamental ways.¹ First, Dr. Crandall has attempted to model choice of carrier as a function of price while the IDSS model makes no effort to estimate market shares as they relate to price or any other factor. Second, Dr. Crandall's model makes explicit estimates of the share of CLEC customers that use resale, unbundling and facilities of their own construction, whereas the IDSS model only allows for distinct treatment of facilities based CLEC services and does not allow for the simultaneous inclusion of unbundled and resold CLEC lines. Third, Dr. Crandall's model allows for variation among three levels of subscriber line density, whereas the IDSS model does not. Finally, Dr. Crandall's analysis concentrates on today's largest eight LECs, while the IDSS model encompasses the entire industry (thus, the IDSS model's industry revenues and access lines are approximately 20% higher than Dr. Crandall's model in the base period). Accordingly, the results from the IDSS and Crandall models for similar scenarios cannot be expected to be exactly the same.

¹ For comparative purposes, all of the analyses presented in this affidavit end with the year 2006. Dr. Crandall's model does not forecast through 2010 as does the IDSS model, and any results beyond 2006 are speculative at this time.


William E. Taylor

Subscribed and sworn to before me
this 5th day of July 1996.


Notary Public

My Commission Expires July 7, 2000

LECG Financial Simulation Model of Effects of FCC Policies on Large Local Exchange Carriers

Dr. Robert Crandall, Senior Fellow of Economic Studies
The Brookings Institution

Dr. William Fitzsimmons, Managing Economist
Law and Economics Consulting Group

Professor Robert G. Harris, University of California, Berkeley *Principal, Law and
Economics Consulting Group*

Professor Leonard Waverman, University of Toronto
Principal, Law and Economics Consulting Group

Simulations of the Effects of FCC Policy Decisions

I. INTRODUCTION AND SUMMARY

This paper describes a spreadsheet model developed by Drs. William Fitzsimmons, Robert Harris and Leonard Waverman of the Law & Economics Consulting Group (LECG) and Dr. Robert Crandall of The Brookings Institution. The model is designed to simulate revenues and operating incomes of the landline telephone operations of the large local exchange carriers (LEC's)¹ under current market expectations and under sets of potential FCC policy decisions. Key policy decisions analyzed in this model include the pricing of unbundled loops, local exchange resale, access bypass, the terms for competitors' purchase and recombination of unbundled elements, and the terms for interconnection. From changes in operating incomes for the landline telephone operations we also estimate the impacts of these simulations on the total "firm" equity value of the composite of the large LECs. The LECG Simulation Model was designed to simulate possible policy alternatives — not forecast or predict outcomes.

The possible financial impacts of policy alternatives are assessed by simulating revenues and operating income for a composite of the large LECs under different policy-driven scenarios. Each scenario is assessed against the *Baseline View* which represents current stock market analyst expectations of LEC performance and reasonable expectations of prices for network elements, resale, and interconnection. In simulating various policy scenarios, the model results reveal that the impacts of inappropriate policy could be dramatic. While the exact simulated results are less relevant than the direction of the effects and their respective orders of magnitude, the model estimates a reduction in large LECs' annual revenues from the *Baseline View* by as much as \$11 billion (11%) in 1998 and \$19 billion (15%) in 2006, which would reduce their annual operating incomes by as much as \$8 billion (37%) and \$16 billion (62%) in the same two years. Across the range of simulations analyzed in the model for this paper, equity values are below the *Baseline View* by 20 percent to 43 percent. Clearly these financial results would represent significant financial impacts to the LECs. Indeed, such results would make it impossible for the large LECs to sustain their investments in the national telecommunications infrastructure.

Two major scenarios, each with two variations, were developed to assess the possible negative impacts on the LECs from unreasonable FCC policy decisions. Each of these scenarios is compared to the *Baseline View*. These scenarios are not offered as predictions of LEC performance. Rather, they are based on set of reasonable assumptions that provide information to assist the FCC in its efforts to promote balanced and efficient competition. The scenarios are developed for a composite of all eight of the large LECs, not the individual companies, and only reflect changes to the performance of the wireline businesses of the LECs (although the impacts on large LEC equity are assessed at the total "firm" level). The four simulation scenarios described in this paper are:

¹ The large LECs include Ameritech, Bell Atlantic, BellSouth, GTE, NYNEX, Pacific Bell, Southwestern Bell, and U S WEST.

Simulations of the Effects of FCC Policy Decisions

- **Scenario 1:** simulation of the effects of unreasonably low prices for unbundled loops (based on Hatfield analysis) and high resale discounts (based on published positions of AT&T), but with no access charge bypass other than on loops controlled by competitors;
- **Scenario 2:** identical to *Scenario 1*, but also simulates the effects of total bypass of terminating access charges by long distance carriers;
- **Scenario 3:** simulation of the recombination of unbundled LEC elements purchased by competitors at incremental cost based on the Hatfield analysis and baseline estimates of volume sensitive costs to provide local service and avoid switched access;
- **Scenario 4:** identical to *Scenario 3*, but with all terminating access delivered through, and paid for, at local interconnection prices.

The model takes 1995 as the data year and projects the size of the local market through a ten year period. In the *Baseline View* and Scenarios 1 and 2, competitors gain shares of the local market by: 1) leasing unbundled exchange lines from the LECs; 2) installing their own exchange lines to customers' premises; and 3) reselling local service purchased at a discount from the LECs. In Scenarios 3 and 4, competitors continue to use the first two options, with the recombination of low-priced network elements dominating the local resale option. How competitors use these options to compete for local customers, the amount of local service revenue they win per customer, and the resulting impacts on intra and interLATA markets are functions of policy choices including: the level of discount for local resale, the prices set for unbundled network elements, and the ability to arbitrage between the prices set for interLATA and local access. Prices, quantities, and revenues for existing services are based on current levels and growth rates that are aligned with stock market analysts' expectations. Prices, quantities, and revenues for new services, such as unbundled loops, resale service, and in-region interLATA service for the LECs, are based on cost estimates and changes in market shares. LEC baseline local market share losses are based on stock market analysts' projections. Changes from these projections in the scenarios are based on the relative prices of unbundled lines, resale service, and the ability of competitors to recombine low priced network elements to provide local service with no facilities investment.

Revenues from high margin switched access service, intraLATA usage, and vertical and ancillary services are crucial to the financial performances of the LECs. Policies that allow competitors to purchase local service at discounts that far exceed avoided costs and to purchase unbundled elements at prices well below reasonable total service long run incremental cost (TSLRIC) with no contribution to other LEC costs would not promote efficient competition and would place severe restrictions on the LECs' abilities to maintain infrastructure investment and high quality service. Given the high concentration of LEC revenues, both geographically and within the highest deciles of revenue producing customers, LEC market share losses from these policies would almost certainly have disproportionately large negative impacts on LEC earnings due to the ability of entrants to target low cost, high revenue customers. Accordingly, the model distributes business and residence customers across three geographic density areas and allows for targeting

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of high revenue customers. The combination of market conditions and inappropriate policies could have disastrous impacts on the financial performance of the LECs

II. THE MODEL

A. Definitions and Overall Assumptions

We restrict our service specific analysis to families of existing services where competition is certain to have an incremental impact. We do not specifically consider services that are competitive today, such as dedicated customer services (private lines).

The following are the relevant services for our incremental analysis. Each is split into business and residential categories:

Basic Local Service: Dialtone, local usage, and Subscriber Line Charge typically billed for residence service as a monthly flat price; price differs substantially for business (\$37.13 in 1995) and residential (\$17.63) customers.

Vertical Services: This includes services such as Call Waiting, Call Forwarding and Caller ID.

Ancillary Services: Includes Number (e.g., directory assistance), Public/Dial 0 (credit card and collect), and other Premium services.

Interstate and Intrastate Switched Access: For IXC's, avoiding switched access will be a cost saving. For other entrants switched access is a potential source of revenues (e.g., by arbitraging the difference between local interconnection rates and access charges). We assume that competitive factors will continue to reduce the prices of this service, and we assume that intrastate prices will fall faster and eventually converge with interstate prices.

IntraLATA Usage: Since the Act ties 1+ presubscription for this service to interLATA relief and, therefore, to competition in the local exchange, the loss of revenue and contribution from this service is relevant in our analysis.

Today these services comprise more than 80% of LEC revenue.

Major new (or expanded) services:

Resale Local Service: We expect many entrants will use resold local exchange service extensively as part of their entry strategy, unless they are permitted to rebundle unreasonably low priced network elements. Entrants use resale to provide service to customers where they do not wish to deploy their own facilities and to build umbrellas of demand before investing in their own transport and switching facilities. In the *Baseline View*, entrants receive a 10 percent wholesale discount for resale local exchange service and intraLATA toll usage. The model also allows for the possibility that some

competitors will provide intraLATA toll usage for their resale customers over their own facilities paying the LECs only for originating and terminating access.

Unbundled Local Loops: We also expect entrants will use unbundled loops extensively. Their goal will be to capture the high margin switched services by providing their own switching or leasing low priced switching from the incumbent LECs if this is available to them. We assume that this form of competition will grow over time, especially in the high density wire centers where competitors can target a large number of customers with relatively minor facilities investments.

Competitor Supplied Exchange Lines: In the *Baseline View* we assume that 15 percent of exchange lines lost to competitors in 1997 will be lost to competitors who supply their own exchange lines, and we grow this share by two percent a year before leveling off in year 2002 at 25 percent of competitors' market share gains. In all of the scenarios we assume that competitors will only supply 15 percent of their own access lines in every year. This reflects our expectation that low prices for unbundled exchange lines, high resale discounts, and the ability of competitors to recombine low priced network elements in the scenarios will inhibit the growth of competitor facilities by making non-facilities options more attractive.

Recombined (Rebundled) Low Price Local Service: It is possible that regulators will try to mandate that the LECs lease all elements of the local exchange at prices equal to low TSLRIC estimates with no mark-up for other LEC costs. To analyze the potential impact on the LECs of this possibility we run scenarios based on the ability of competitors to lease and recombine low priced elements of the LEC networks. In scenarios 3 and 4 we assume that recombined local service dominates local resale service as described above.

Local Interconnection: We assume reciprocal interconnection (but not bill and keep). Traffic imbalances and net interconnection revenues are, therefore, assumed to be zero. It is possible, however, that competitors will be able to redirect long distance traffic into the LECs' networks at local interconnection rates.²

InterLATA Usage: We assume that the large LECs will begin offering widespread in-region interLATA service in mid 1997 on a resale basis.

Other Considerations and Assumptions:

LEC access lines are grouped by density categories reflecting the greater costs associated with longer loops in lower density wire centers. Density is measured by access lines per square mile for each wire center. We translate the categories used by the DOJ (in people per square kilometer) for direct comparison. We use LEC data to distribute access lines into three density categories.

² We recognize the potential for competitors to create an unfavorable imbalance in traffic with service to information service providers (ISPs), but we are not analyzing this issue explicitly in this version of the model.

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Area A	> 2,000 exchange lines per square mile
Area B	> 150 and <2000 exchange lines per square mile
Area C	< 150 exchange lines per square mile

Competitors will target the LECs' high revenue, low cost customers. Concentrations of business and residential revenues are used to determine the expected ranges of revenue losses for the LECs due to targeted marketing by LEC competitors.

The Base Year (Year 0) is 1996. Financial impacts begin in Year 1 (1997). The analysis extends for ten years. The foundation for the *Baseline View* and all Scenarios is the overall size of the market for existing services. Beginning with revenue and quantity information from ARMIS, and supplemented by LEC data and discussions with the LECs, we establish base year prices and quantities. We derive year over year price and quantity changes for existing services based on analyst estimates, and apply those changes to simulate the overall market size from 1996 through 2006. The *Baseline View* is established by applying market share trajectories against the overall market exchange lines and allowing for the expectation that competitors will win customers with greater than average revenues per line.

B. The Baseline View of Large LECs

Based on our analysis of Large LEC share prices, it is evident that capital markets already reflect serious shareholder concerns over implementation of Telecommunications Act. Since December 1995, the market capitalization has declined by \$13 billion for the composite large LEC and its cost of capital had increased nearly one hundred basis points. While industry analysts' recent reports project substantial LEC market share losses, they do not project continuing decline in financial performance due to unreasonably low unbundled loop prices, unreasonably high resale discounts, the ability of competitors to rebundle low-priced network elements, or additional switched access bypass. They also project sizable interLATA revenues for the LECs. Hence, in our view, it is likely that the current share prices of the large LECs incorporate only the effects of efficient competition in local exchange services based on reasonable interconnection and access prices, NOT the effects of regulatory policies that are biased in favor of competitors and are detrimental to the financial viability of the LECs.³

Key Assumptions

³ We reviewed a wide variety of analysts reports, including reports by Goldman Sachs, Smith Barney, Merrill Lynch, Lehman Brothers, Blake Bath, Dillon Read, Brothers, Donaldson Lufkin & Jenrette, Smith Barney, Dennis Leibowitz, and Morgen Stanley. Due to the great amount of detail available through Morgan Stanley, we relied most heavily on their report, U.S. Investment Research, Telecommunications Services, The Regional Bell Operating Companies: Let the Games Begin. September 20, 1995.

Simulations of the Effects of FCC Policy Decisions

Customer Behavior: Customers who choose a LEC competitor for local exchange service will purchase all local and long distance service from that competitor.

Competitor Behavior: Competitors will act rationally and target the highest revenue and lowest cost customers. For the large LECs, 65 percent of their business revenue is generated by the top 10 percent of the business customers. The majority of competitors' local exchange lines will be leased from the LECs rather than installed by competitors. With reasonably priced loops, the percentage of competitor supplied, facility-based loops will increase.

Prices: In the model, prices for unbundled links (loops) are based on TSLRIC estimates according to geographic density. Areas with high exchange line densities have lower costs and, therefore, lower unbundled loop prices. Baseline prices for unbundled loops include realistic estimates of TSLRIC and the possibility for some contribution above TSLRIC for shared and common additional LEC costs. Our baseline unbundled loop prices are:

Area A	\$13.64
Area B	\$17.58
Area C	\$35.42

These prices are based on costs from the Cost Proxy Model developed by INDETEC and Pacific Bell.⁴ These TSLRIC cost estimates are consistent with LECG's own work in upgrading U S WEST's cost models, as explained in the testimony of Dr. Harris in several states.⁵

The price for local resale is the retail price less the Baseline discount of 10 percent for avoided costs. Baseline discounts for the resale of local service are based on the net of avoided costs and additional network, tracking, billing, and other costs. Reasonable discount rates are set using information from recent resale agreements.⁶

Costs: With local resale and unbundling, LECs continue to incur significant costs for the access lines leased by competitors. Facilities based competition reduces the LECs' variable costs as competitors provide services on their own facilities. LECs, however continue to incur the costs

⁴ We worked with INDETEC International and staff at Pacific Bell to devise TSLRIC numbers for local exchange service and for unbundled loops. INDETEC also assisted with cost information for the calculation of foregone costs when competitors provide service on their own facilities..

⁵ Testimony of Dr. Harris in Oregon (Docket UM 773), Colorado (96-218T), and Utah (Docket No. RPU-94-2202-01).

⁶ It is important to note that any business, including the LECs, need to cover all of their operating costs, which include shared and common costs. In the case of the LECs, during the transition to competition it is also necessary to consider the equitable recovery of undepreciated plant that is due to the fact that regulators have consistently forced these companies to adopt longer depreciation lives than they would have chosen for themselves.

Simulations of the Effects of FCC Policy Decisions

of operating and maintaining the facilities leased by competitors. In several instances we overstate the costs that would be avoided by the LECs when competitors provide some of their own facilities. For instance, we assume that the LECs will avoid the full amount of TSLRIC for exchange lines in the year that a competitor supplies its own exchange lines. In reality the full measure of this cost will not be avoided for several years.

InterLATA Entry: LECs will begin offering widespread in-region interLATA service by mid-1997. Margins for this service will begin low, due to marketing and other start-up expenditures, and increase over a five year period.

Interconnection: FCC policies and enforcement will prevent long distance providers from arbitraging switched access prices by delivering long distance traffic into the LEC network at local interconnection prices. Even with large market share differences between competitors, we assume that local interconnection traffic will remain reasonably balanced unless policies provide incentives that lead to imbalances.

LECs' Investment: We assume that the large LECs' substantial investment obligations required to provide ready-to-serve capacity to all customers and competitors in their service area continue and are constant across all scenarios, even when these obligations would require investments in facilities that are leased or resold to competitors at prices that are below cost.⁷ We realize that this assumption is unrealistic, because capital markets will NOT allow LECs to invest under such conditions; moreover, regulatory policies that require noncompensatory prices or investment may well violate constitutional protections against "takings" without just compensation. However, we have made this assumption in the scenarios to simulate the effects of such investment obligations and to quantify their harm.⁸

LEC investment obligations are unchanged from the *Baseline View* in all scenarios, with the exception of foregone TSLRIC costs for competitor supplied access lines and the costs foregone on unbundled lines when competitors supply local switching, vertical, ancillary, switched access, and intraLATA usage services using their own facilities.

⁷ The large LECs invest approximately \$17 billion in their wireline business annually.

⁸ We note that IXC's and other CLECs are demanding that LECs maintain "modern infrastructure...to allow local service competitors access to bundled and unbundled network elements, functionalities and capabilities..." (CA Telecommunications Coalition, 5/30/96).

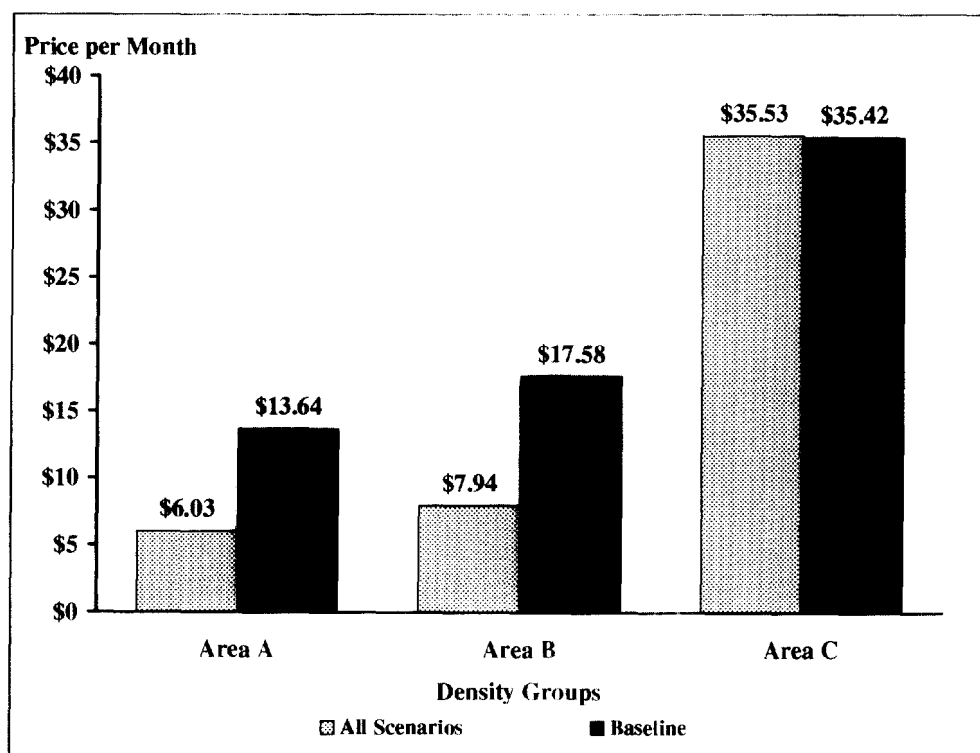
C. Low Unbundled Loop Price and High Resale Discount Simulation

Scenario 1: *Low Unbundled Loop Prices (with no low price recombination of local service elements).*⁹

Assumptions and Financial Results

Unbundled loop and interconnection prices are set at unrealistically low TSLRIC estimates (i.e., the exchange line prices approximate the TSLRIC levels used by the DOJ in its comments based on the Hatfield model, with no contribution to additional LEC fixed and common costs).

Figure 1: *Alternative TSLRICs of the Local Loop*



Discounts for the resale of bundled local service are based on AT&T's requested discounts in the range of 35 percent and more.

⁹ Unbundled loop and interconnection prices are the same in all four scenarios.

Simulations of the Effects of FCC Policy Decisions

Increases in market share losses from the *Baseline View* would occur due to the relatively lower prices for unbundled lines and higher resale discounts. These incremental losses in market share are determined using switching elasticities.

Changes from the *Baseline View* in the distribution of unbundled loops and local resale are a function of the relative cost of competitors providing local service on leased loops with their own switching compared to the price of local resale.

In this scenario we assume that regulators are successful at preventing long distance providers from avoiding switched access prices by illegally dumping long distance traffic into the network at local interconnection prices. Failure to prevent this activity would be equivalent to reducing the price of switched access to the much lower price of local interconnection.

LEC investment obligations are unchanged from the *Baseline View*.¹⁰

We estimate that these policies would have substantial financial consequences for the LECs. Relative to the *Baseline View*, operating income could drop in 1998 and 2000 by as much as \$1.6 and \$4.4 billion, and equity value could decline by 20 percent.

Scenario 2: *Same assumptions as Scenario 1, but with all terminating access delivered through, and paid for at local interconnection prices (i.e., regulators fail to prevent arbitrage).*

Assumptions and Financial Results

In this scenario we assume that competitors are able to redirect long distance traffic into the LECs' network at local interconnection prices. To demonstrate the magnitude of the possible financial impact on the LECs of this type of arbitrage, we assume that competitors redirect all of the remaining terminating traffic in this manner.

The estimated incremental impacts (i.e., the change from *Scenario 1* to *Scenario 2*) on operating income in 1998 and 2000 are in the range of negative \$1.5 and \$4.1 billion dollars respectively. Equity value could decline by an additional 10 percent, or more.

D. Low Unbundled Loop Price and Low-Priced Rebundling of Network Elements

Scenario 3: *Recombination of Local Service Using Low-Priced Network Elements*

¹⁰ Universal service funding should not be seen as a panacea for solving the pricing problems addressed in these simulations. Universal service funding of the magnitude necessary to address these issues would not be sustainable, and would maintain current price distortions and preclude efficient and beneficial competition.

Simulations of the Effects of FCC Policy Decisions

Assumptions and Final Results

In this scenario regulators mandate that the LECs lease all elements of the local exchange at prices equal to unrealistically low estimates of TSLRIC (e.g., from Hatfield's analysis). The opportunity to rebundle local service at low prices will dominate the local resale option and shift the composition of competitive losses from unbundled loop and competitor supplied switching toward recombined services with no competitor supplied facilities.

LEC investment obligations are unchanged from the *Baseline View*.

Once again, we assume that regulators are successful at preventing long distance and wireless service providers from avoiding switched access prices by terminating long distance traffic into the network at local interconnection prices.

We estimate that these policies would have even greater financial consequences for the LECs than *Scenario 1*. Relative to the *Baseline View*, operating income could drop in 1998 and 2000 by as much as \$7.0 and \$9.0 billion, and equity value could decline by more than 35 percent.

Scenario 4: *Same assumptions as Scenario 3, but with all terminating access delivered through, and paid for at local interconnection prices.*

Assumptions and Final Results

As we did in *Scenario 2*, in this scenario we assume that competitors deliver long distance traffic into the LECs' network at local interconnection prices.

The estimated incremental impacts (i.e., the change from *Scenario 3* to *Scenario 4*) on operating income in 1998 and 2000 are in the range of negative \$1.3 and \$3.3 billion dollars respectively. Equity value could decline by an additional 8 percent.

III. ADDITIONAL FINANCIAL RESULTS AND CONCLUSIONS

By comparing the simulated financial results of large LECs in each of the four scenarios to the *Baseline View* (and in varying versions of each scenario), we can assess the impact of specific policy variables by examining the differences in simulated financial results. These results are for the composite large LEC. In these simulations, the composite LEC experiences significant losses in revenues relative to the *Baseline View*, and even more dramatic losses in terms of operating incomes. Revenue and operating income declines relative to the *Baseline View* for year ten are depicted in Figure 2.

Figure 2: *LEC Tenth Year Annual Revenue Loss and Operating Income Loss Relative to Baseline View*

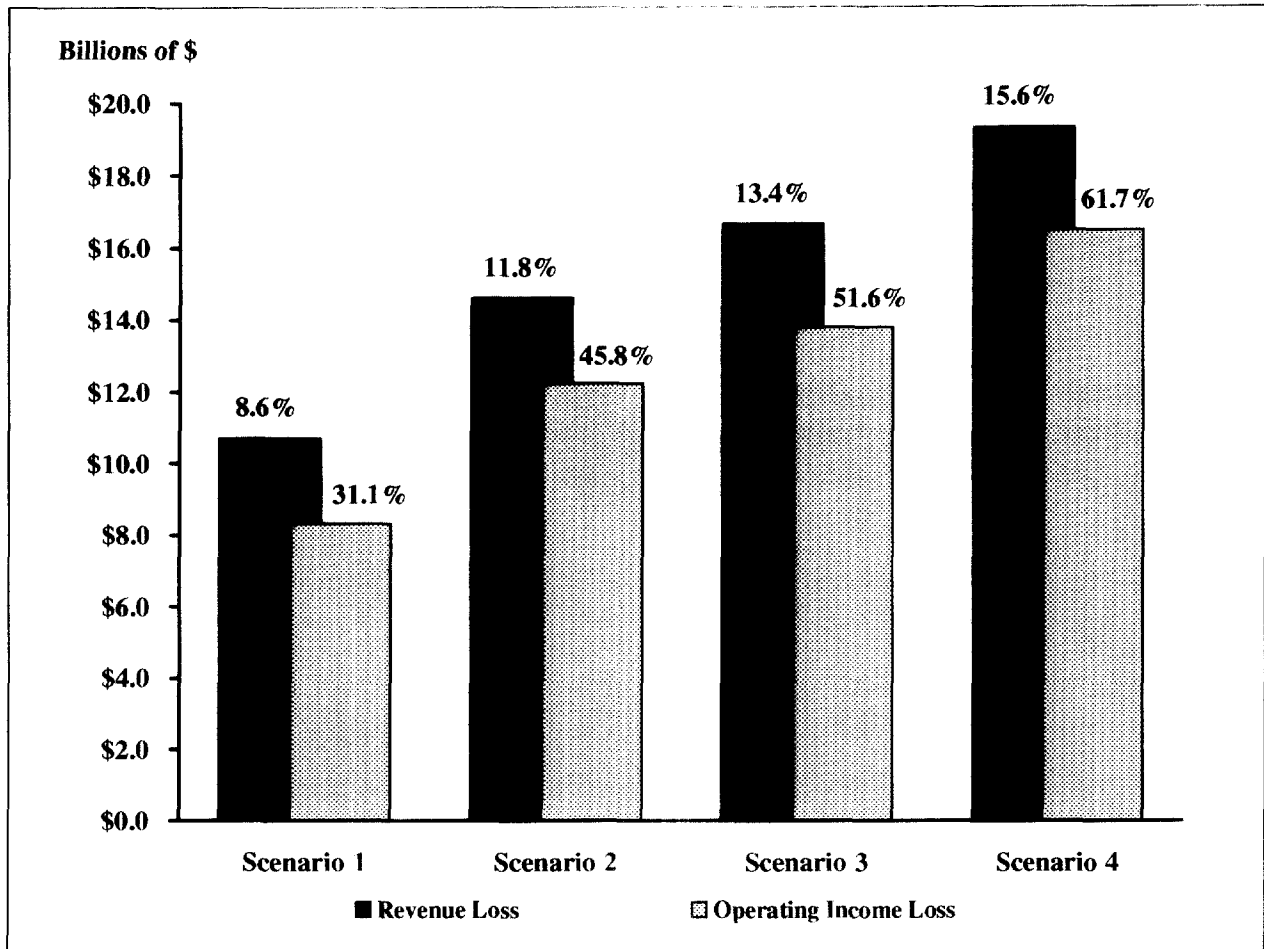
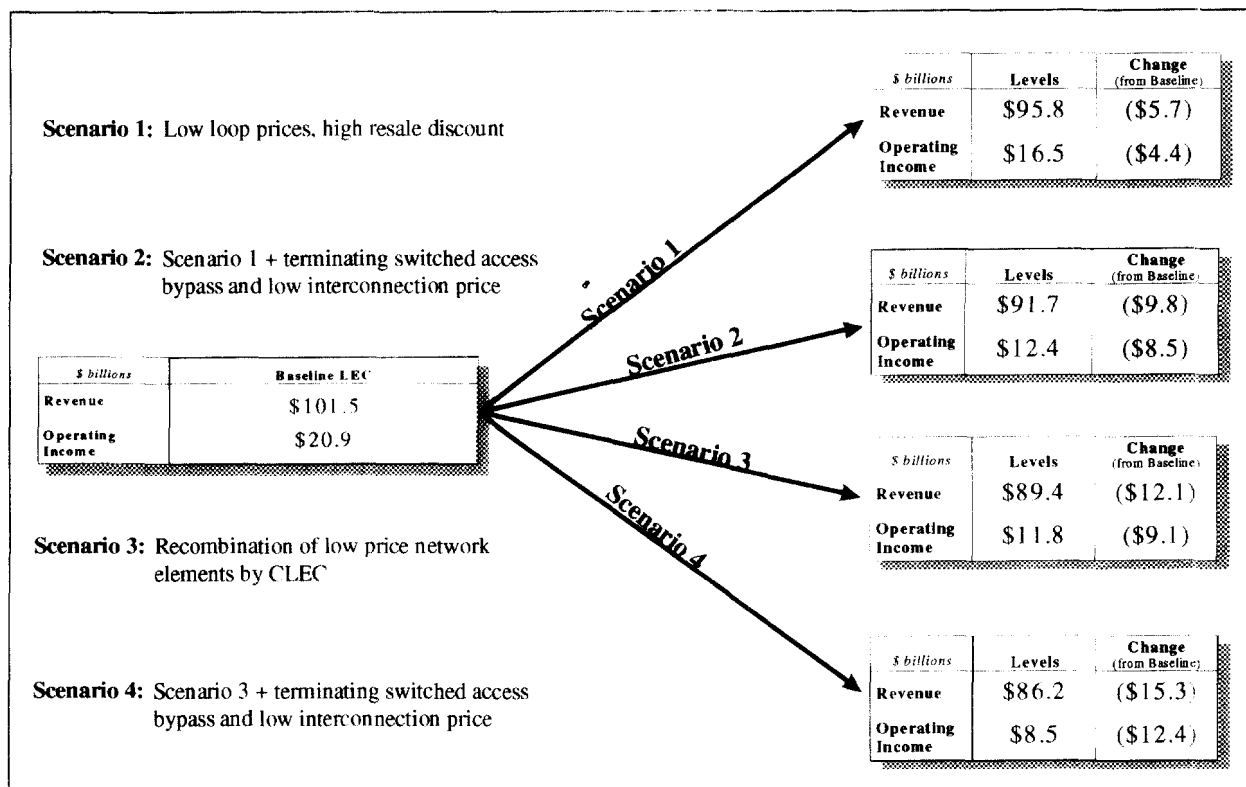


Figure 3 provides similar information for year 2000. Figure 3 also provides levels for revenue and operating income for the *Baseline View* and the four scenarios.

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Figure 3: Simulated Differences in Annual Large LEC Revenues and Operating Income in Year 2000 (Year 4)



Equity Value Implications

As noted, the passage of the Telecom Act itself signaled to the investment community an increase in risk for the large LECs. The investment community does not, however, consider the intricate details of TSLRIC or the potential devastating effects of unreasonable policies on resale discounts in its analyses. The model simulations show potential large decreases in revenues and operating income from careless policy implementation. These impacts on income directly affect equity values.

We simulate the hypothetical effects of the scenarios on equity values in several ways, all of which point to potential devastating impacts on equity so severe that alternative policies would need to be chosen to compensate for the losses. Again, these results are in no way forecasted impacts, since these results should not be allowed to happen

First, we construct a Gordon growth model¹¹ based on dividend flows. Using the 1995 division of wireline and non-wireline income (74%), the 1995 dividend pay-out ratio of 67%, a cost of

¹¹ The Gordon growth model simply stated is that equity value of a firm can be estimated by discounting the expected dividends using the appropriate cost of capital. We discount the dividends projected in our

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capital of 10%, analysts' forecast of non-wireline growth of 9%, and the growth rates derived from the Baseline and scenario runs, total company market values are estimated. Included in the estimate is the present value of the companies in 2006 discounted to the present. We assumed robust growth from landline operations post 2006. We show the market value of the large LECs as \$233 billion in the *Baseline View* and unsustainable decreases in market value of 20, 31, 35, and 43 percent respectively, for Scenarios 1 through 4 (see Figure 4). These substantial decreases are simulated even without an increase in the cost of capital in the scenarios. We maintain a cost of capital of 10 percent throughout, even though large losses in wireline earnings would surely lead to higher costs of capital and greater losses in market values.

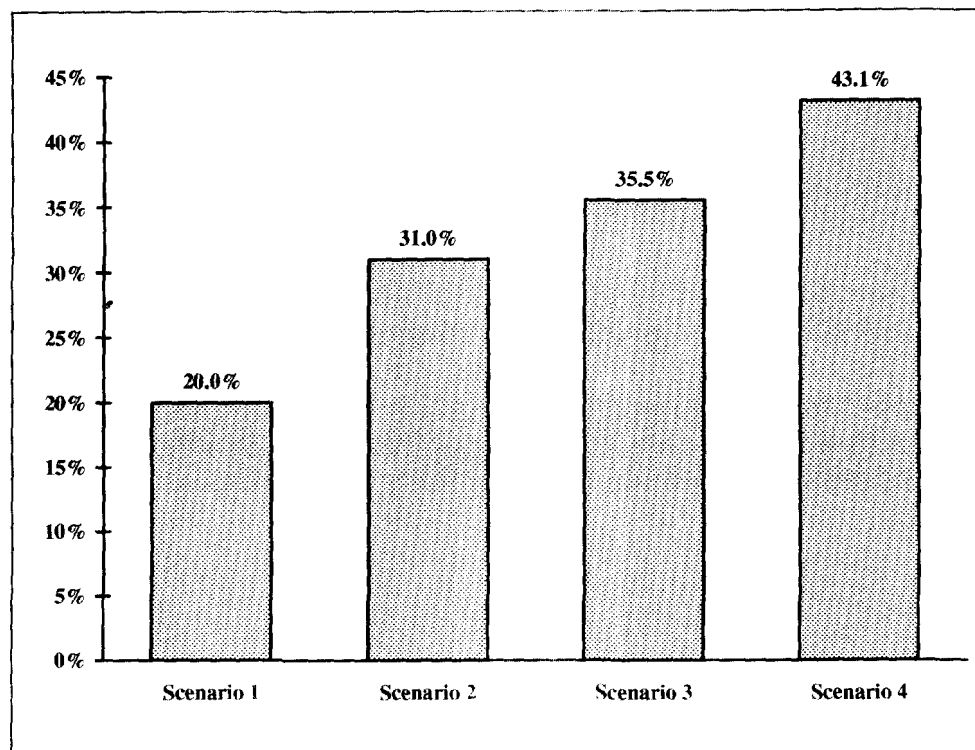
Alternatively, we modeled the free cash flow¹² of the large LECs and discounted this sum, again utilizing the discounted forward value in 2006. No difference in fundamental impacts resulted.

Finally, we took the present value of the difference in operating income between the scenarios and the *Baseline View*, doubled this to roughly approximate the addition of a terminal value in 2006 and compared this sum to the loss in market value implied by the Gordon growth model. The results were comparable.

simulations on a annual basis and calculate the terminal value using a strict application of the formula: $\text{Equity} = (\text{Net Income} * \text{Dividend Pay-Out Ratio}) / (\text{Cost of Capital} - \text{Growth Rate})$.

¹² We assume that capital expenditures and depreciation continue to be approximately equal and, therefore define free cash flow for valuation purposes as net income plus after tax interest. The sum of these free cash flows discounted to the present represents the sum of the firms' values. We back out the equity value using current debt to equity ratios.

Figure 4: *Percentage Loss in Equity Net Present Value in Each Scenario Relative to the Baseline View*



Conclusions

The LECG Simulation Model, built in conjunction with Robert Crandall of The Brookings Institution, uses ARMIS and LEC data and information from analyst reports to establish a Baseline View of a composite of the large LECs. In the *Baseline View* we account for differences in density costs, targeting of high revenue customers by LEC competitors, and the impacts of unbundling lines and local resale with reasonable prices and other policies. In the scenarios we introduce low unbundled prices and high resale discounts and account for changes in market shares and shifts in the mix among unbundled lines, local resale, competitor built facilities, and competitor recombined LEC network elements based on the relative prices facing competitors.

These scenarios demonstrate that under reasonable sets of assumptions, unreasonably low prices for network elements and large discounts on local exchange service would have devastating implications on LEC financial viability. The impacts could be significantly worse if competitors are able to bypass substantial amounts of their switched access charges, and/or competitors can lease and recombine low priced network elements to offer their own end-to-end service, including switched access and intraLATA usage. To avoid these results, the FCC should adopt policies that promote efficient competition, by adopting pricing guidelines that ensure the recovery of LECs' economic costs and prevent competitors from rate arbitrage or exploiting the uneconomic retail price structures that prevail in many states.

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Moreover, the FCC should weigh the potential benefits from an acceleration in competition or an increase in the number of competitors against the dramatic downside risks of inappropriate prices and policies such as unreasonably low prices for unbundled loops and other network elements and policies that allow carriers to recombine unbundled local exchange service elements to avoid access charges. Policies such as these will not stimulate facilities-based competition as envisioned by the Telecommunications Act and would have serious implications on the LECs' financial positions. This, in turn, would pose significant restrictions on investment, quality of service, customer choice, consumer welfare and the continued growth and development of the national information infrastructure.